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FRISHAUF, HOLTZ, GOODMAN & CHICK, PC			ZIMMERMANN, JOHN P	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/509,485	TATSUTA ET AL.
	Examiner	Art Unit
	John P. Zimmermann	2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 10 September 2007.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 24 and 26-56 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 24 and 26-56 is/are rejected.
- 7) Claim(s) 55 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 27 September 2004 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 01 Jun 2007, 11 Sep 2007
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) Notice of Informal Patent Application
- 6) Other: _____

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DETAILED ACTION

Drawings

1. The drawings were originally objected to by the examiner as failing to comply with 37 CFR 1.84(p)(5). Following the specification amendments in relation to the drawings, the examiner now finds the drawings to be in compliance with 37 CFR 1.84(p)(5).

Response to Amendment

2. The amendment to the claims filed on 10 September 2007 does not comply with the requirements of 37 CFR 1.121(c) because amended **claim 55** is not indicated as such with the proper identifier in the claim listing. Amendments to the claims filed on or after July 30, 2003 must comply with 37 CFR 1.121(c) which states:

(c) *Claims.* Amendments to a claim must be made by rewriting the entire claim with all changes (e.g., additions and deletions) as indicated in this subsection, except when the claim is being canceled. Each amendment document that includes a change to an existing claim, cancellation of an existing claim or addition of a new claim, must include a complete listing of all claims ever presented, including the text of all pending and withdrawn claims, in the application. The claim listing, including the text of the claims, in the amendment document will serve to replace all prior versions of the claims, in the application. In the claim listing, the status of every claim must be indicated after its claim number by using one of the following identifiers in a parenthetical expression: (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).

Since the reply filed on 10 September 2007 appears to be *bona fide*, and in an effort to move forward in the prosecution of the application, examiner has elected to merely object to amended **claim 55** and request that applicant submit an amendment in compliance with 37 CFR 1.121 in future correspondence.

Specification

3. The examiner has approved the changes to the specification including the abstract submitted on 10 September 2007.

Claim Objections

4. The examiner has approved the changes to the claims submitted on 10 September 2007, and the objection to **claims 40 & 48** has been withdrawn.
5. Amended **claim 55** is objected to because the amended claim is labeled (Original), rather than (Currently Amended) on page 16 of the Applicant's Amendment dated 10 September 2007. Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The applicant has canceled **claims 3, 6, 8, 10, 14, 18, & 19**; therefore the 35 U.S.C. 112, 2nd Paragraph rejection of these claims is moot.
7. The examiner has accepted the decision of the applicant to be his own lexicographer and in doing so has broadly defined both geometric property format and geometric properties as related to **claims 27, 29, 33, 40, 43, 44, & 49**; therefore, these claims, now being reconsidered, overcome the 35 U.S.C. 112, 2nd Paragraph rejection.
8. The examiner has approved the amended **claims 46, 47, & 54** and now these claims, in addition to further objected to **claim 55**, being reconsidered, overcome the 35 U.S.C. 112, 2nd Paragraph rejection.
9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Rejection of **Claims 31 & 41** under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention is maintained as neither of the claims, nor the claims on which they depend have been amended to overcome the rejection.

11. **Claim 31** recites the limitation “the plurality of recording means” in line 10 on page 9 of the Applicant’s Amendment dated 10 September 2007. Appropriate correction is required. There is insufficient antecedent basis for this limitation in the claim. For purposes of applying prior art, the examiner interprets this as intending to read “a plurality of recording means.”

12. **Claim 41** recites the limitation “the transporting belt” in line 2 on page 12 of the Applicant’s Amendment dated 10 September 2007. There is insufficient antecedent basis for this limitation in the claim. For purposes of applying prior art, the examiner interprets this as intending to read “a transporting belt.”

Claim Rejections - 35 USC § 101

13. The applicant has canceled **claims 1-23**; therefore the 35 U.S.C. 101 rejection of these claims is moot.

Claim Rejections - 35 USC § 103

14. The applicant has canceled **claim 25**; therefore the 35 U.S.C. 103(a) rejection of this claim is moot.

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

17. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

18. **Claims 24, 30, 33, 34, 36-39, 46-48, 51, 52, 54 & 55** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Komiya et al.**, (US 6,287,027 B1) in view of **Shimada et al.**, (EP 0 988 990 A2).

- a. As related to independent **claim 24**, Komiya et al. teach a geometric property analyzing system for analyzing the properties of a printer, a reader, and the recording medium, this system includes a image pickup means and an analyzing means (Komiya et

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al. – Abstract and Figure 6 shown below) which could include analysis to minimize error in accordance with the known sum of squares equation.

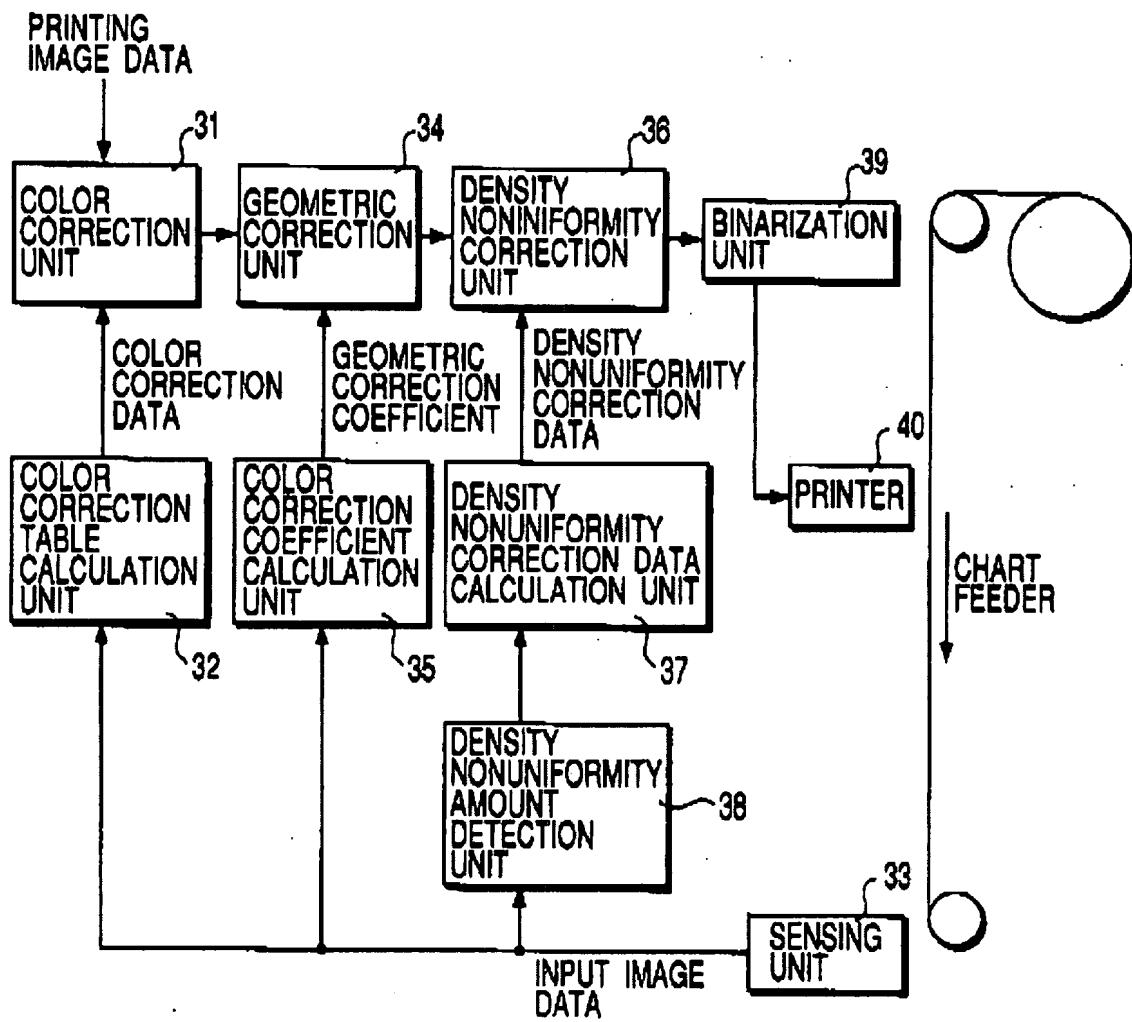
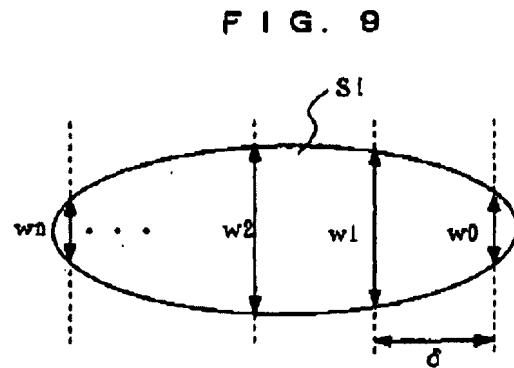
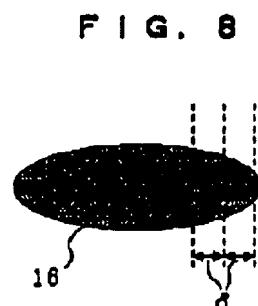
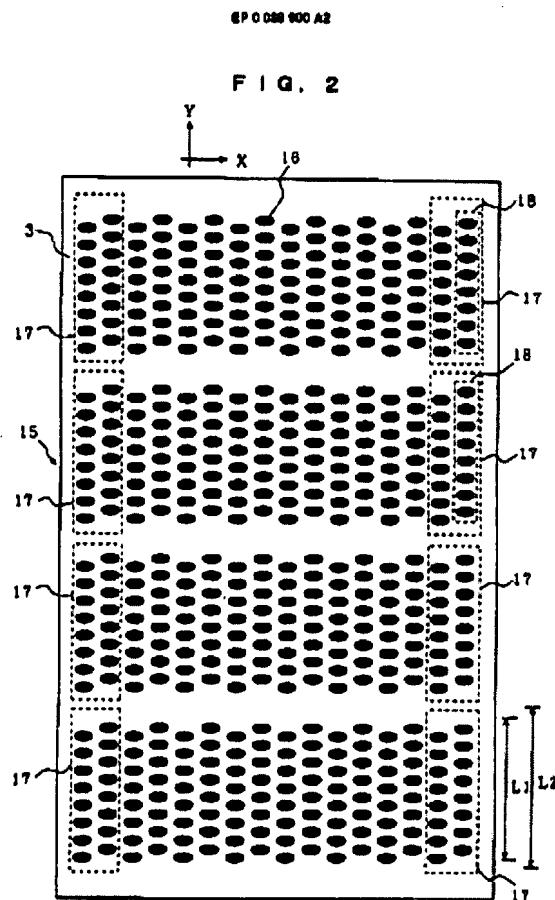


FIG. 6

b. Continuing with **claim 24**, Komiya et al. teach a test image storage means for storing the geometric property format, included in the system, as well as a storage unit for storing the calculated parameters (Komiya et al. Summary, Column 2, Lines 48-58). Komiya et al. *do not* teach the number of recording marks based on the predetermined

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geometric property format. **However**, Shimada et al. teach a number of recording marks of size 80 to 100um, arranged in groups taking up an area that is based on the predetermined geometric property format [i.e. readable by the set precision of the device being analyzed] (Shimada et al. – Paragraph 49, Lines 1-5 and Figures 2, 8 & 9, shown below).



c. As related to dependent **claim 30**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 24**, for the reasons above. Additionally, Komiya et al. teach at least one recording means, a printhead (Komiya et al. – Summary,

Column 5, Line 22), for recording the marks on a recording medium having a recording face called a paper sheet (Komiya et al. - Description, Column 7, Line 24).

d. As related to further dependent **claim 33**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 30**, for the reasons above.

Additionally, Komiya et al. teach reconstructing the property format based upon the analysis results so as to perform the recording on the recording face of the recording medium by the recording means (Komiya et al. – Summary, Column 5, Lines 26-31 and Figure 4A, shown previously).

e. As related to further dependent **claim 34**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 30**, for the reasons above.

Additionally, Komiya et al. teach adjusting the recording means based upon the analysis results (Komiya et al. – Summary, Column 5, Lines 29-31, Figure 6, shown previously and Figure 7, shown below).

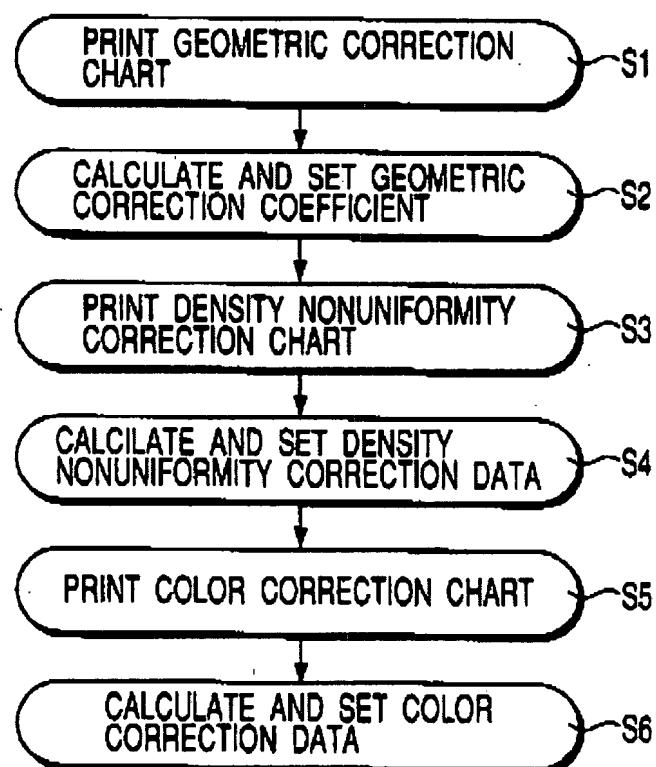


FIG. 7

f. As related to further dependent claim 36, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 30**, for the reasons above. Additionally, Komiya et al. teach a transporting means for transporting the recording medium relative to the printer and an image pickup means downstream of the recording means along the transporting direction, which is formed of a line sensor (Komiya et al. - Figure 6, shown previously and Figure 12B, shown below).

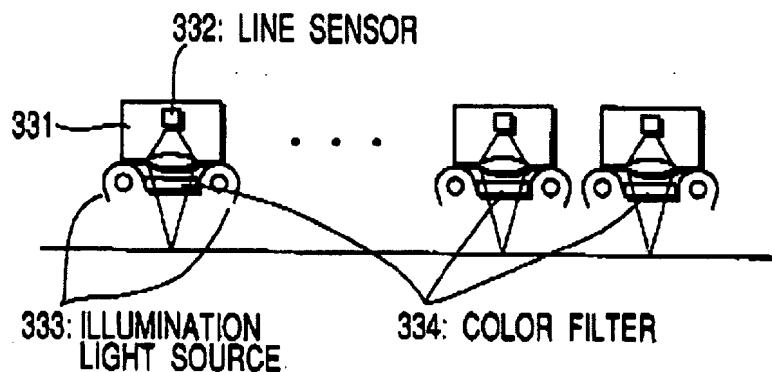


FIG. 12B

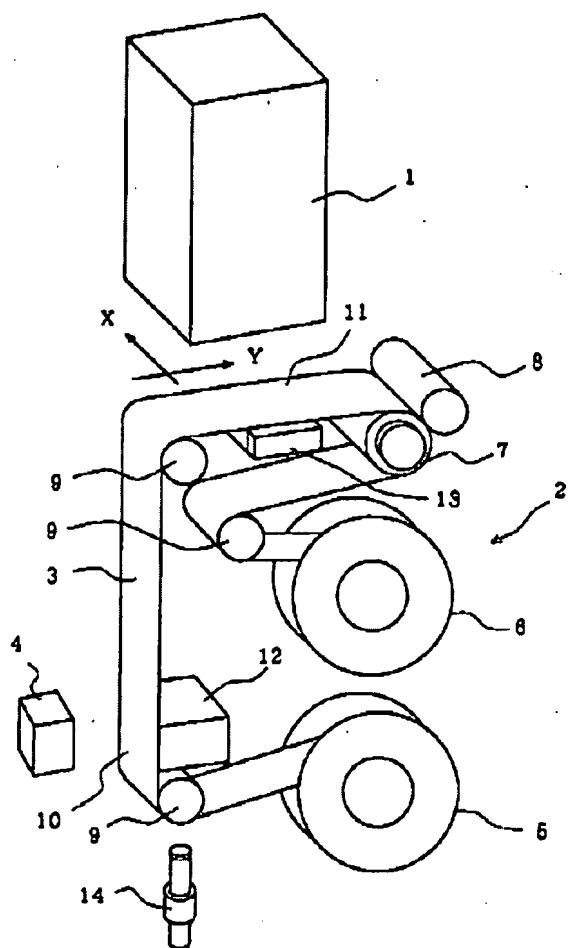
g. As related to dependent **claim 37** and further dependent **claim 47**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 30**, for the reasons above. Additionally, Komiya et al. teach a plurality of print heads, each having a plurality of nozzles thereby teaching a printing apparatus employing the analyzing system (Komiya et al. – Title & Abstract), and Shimada et al. teach an ink drop test pattern printed on a test recording medium by a printing head (Shimada et al. – Description, Paragraph 15, Lines 31-33).

h. As related to dependent **claim 38**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 30**, for the reasons above. Additionally, Shimada et al. teach a recording means with a recording resolution less than the resolution of the image pickup means (Shimada et al. – Description, Paragraph 47, Line 26, Paragraph 49, Line 36, and Figures 8 & 9, shown previously).

i. As related to dependent **claim 39**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 30**, for the reasons above. Additionally, Shimada et al. teach the analyzing means being a separate publicly known device

connected to the image pickup means by a cable, and the image pickup means formed together with a recording means (Shimada et al. – Description, Paragraph 46, Lines 14-17, and Figure 1, shown below).

FIG. 1



j. As related to further dependent **claim 46**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 30**, for the reasons above. Additionally, Komiya et al. teach the use of the aforementioned analyzing system in an image printing apparatus, also referred to as a printer (Komiya et al. – Title & Abstract).

k. As related to independent **claim 48**, Komiya et al. teach an analyzing method for analyzing the properties of a printer, a reader, and the recording medium, this system includes a image pickup step and an analyzing step (Komiya et al. – Abstract and Figure 6, shown previously) which could include analysis to minimize error in accordance with the known sum of squares equation. Included in the method Komiya et al. teach a test image storage step for storing the geometric property format, as well as a storage unit for storing the calculated parameters (Komiya et al. - Summary, Column 2, Lines 48-58 and Figure 7 shown previously). While Komiya et al. teach a printing step (Komiya et al. – Summary, Column 4, Line 65; Column 5, Line 22 and Figure 7, Reference #S1 shown above), they *do not* teach printing the number of recording marks based on the predetermined geometric property format. **However**, Shimada et al. teach a number of recording marks of size 80 to 100um, arranged in groups taking up an area that is based on the predetermined geometric property format [i.e. readable by the set precision of the device being analyzed] (Shimada et al. – Paragraph 49, Lines 1-5 and Figures 2, 8 & 9, shown below).

EP 0 088 900 A2

FIG. 2

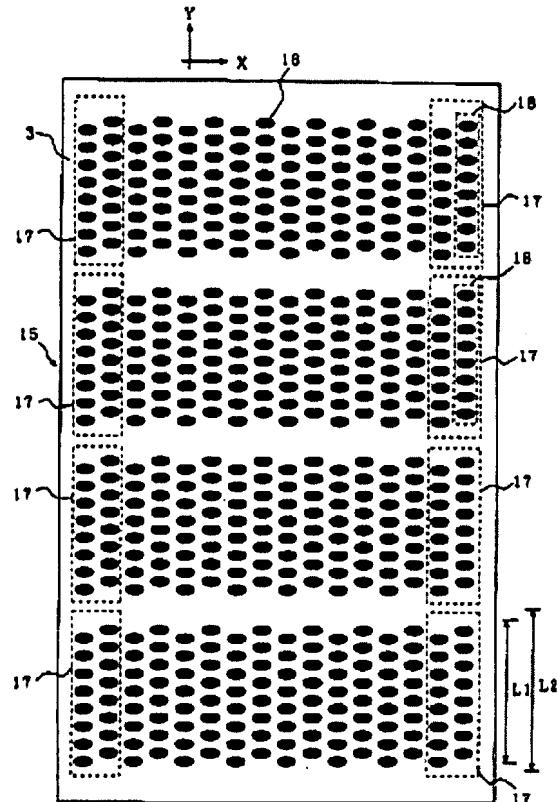


FIG. 8

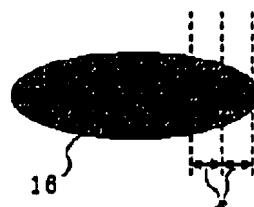
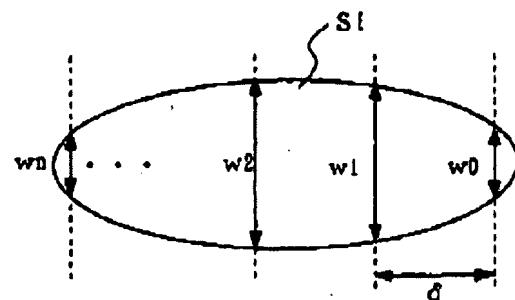


FIG. 9



l. As related to further dependent **claim 51**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 48**, for the reasons above. Additionally, Komiya et al. teach a step during which at least one recording means, a printhead (Komiya et al. – Summary, Column 5, Line 22), records the marks on a recording medium having a recording face called a paper sheet (Komiya et al. - Description, Column 7, Line 24).

m. As related to further dependent **claim 52**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 51**, for the reasons above.

Additionally, Komiya et al. teach adjusting the recording means based upon the analysis

results (Komiya et al. – Summary, Column 5, Lines 29-31, Figures 6 & 7, shown previously).

n. As related to further dependent claims 54 & 55, the previous combination of Komiya et al. and Shimada et al. teach the limitations of claim 48, for the reasons above. Additionally, Komiya et al. teach the use of the aforementioned analyzing system in an image printing apparatus, also referred to as a printer having a plurality of nozzles (Komiya et al. – Title & Abstract) while relating the background of the invention to apply specifically to printing using inkjet print heads (Komiya et al. – Background, Column 1, Line 11).

o. Given the same field of endeavor, specifically an image forming apparatus with a defect detection system and correction means, it is apparent that one of ordinary skill in the art at the time the invention was made would have been motivated to use whatever mathematical equation was required to produce the most accurate results and minimize errors to include the well known sum of squares while combining the precision requirements and the test chart requirements as taught by Komiya et al. with the use of a specific ink-jet head and the use of a specific number of marks, specifically located as required for proper precision and the test chart comprising multiple groups as taught by Shimada et al., in an effort to judge any failure or aberration on a group or component basis (Shimada et al. – Abstract, Lines 11-12), as well as to do so with publicly known devices so as to avoid the need of illustrative description (Shimada et al. – Description, Paragraph 46, Lines 14-17).

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19. Claims 26-29, 31, & 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komiya et al., (US 6,287,027 B1) and Shimada et al., (EP 0 988 990 A2) as applied to claim 24 & claim 30 above, and further in view of Taka et al., (US 7,106,942 B2).

a. As related to dependent claims 26 & 29, the previous combination of Komiya et al. and Shimada et al. remains as applied above, but *does not* specifically teach dividing the test chart into a plurality of chart components. *However*, Taka et al. teach dividing the test chart into a plurality of chart components to perform a relative comparison between the properties of them (Taka et al. – Description, Column 12, Line 12 and Figures 6(a) & 6(b) shown below).

F I G. 6 (a)

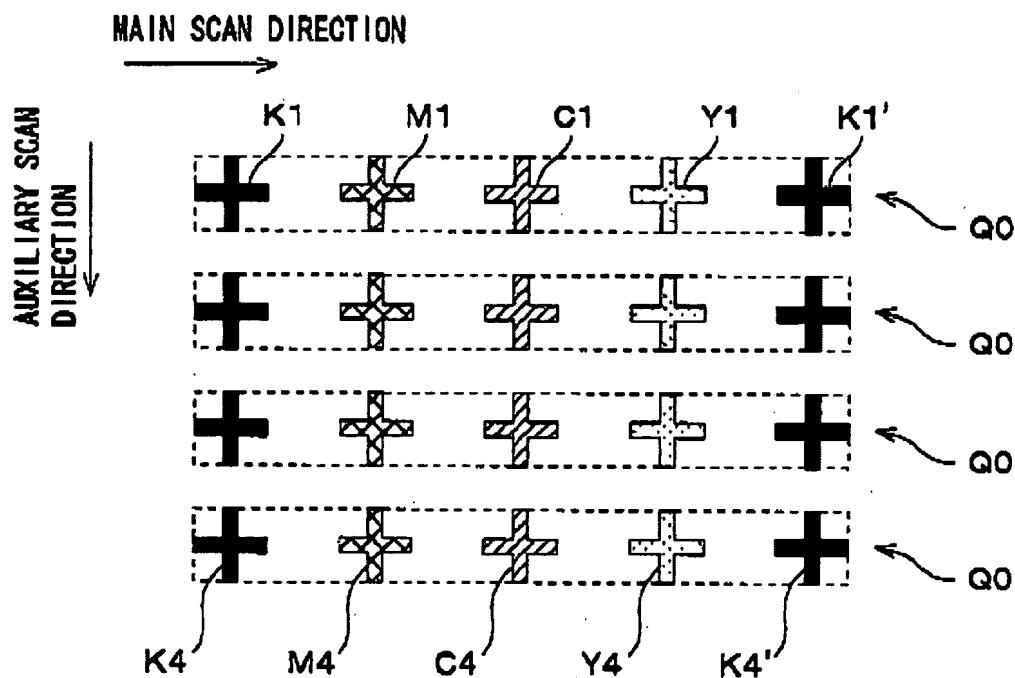
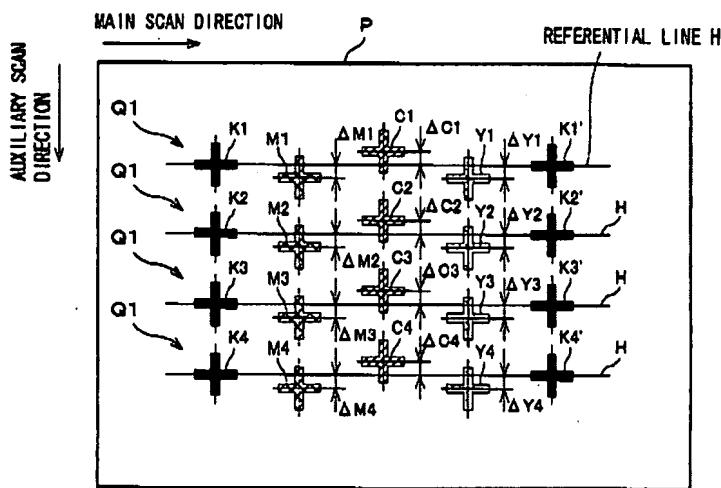
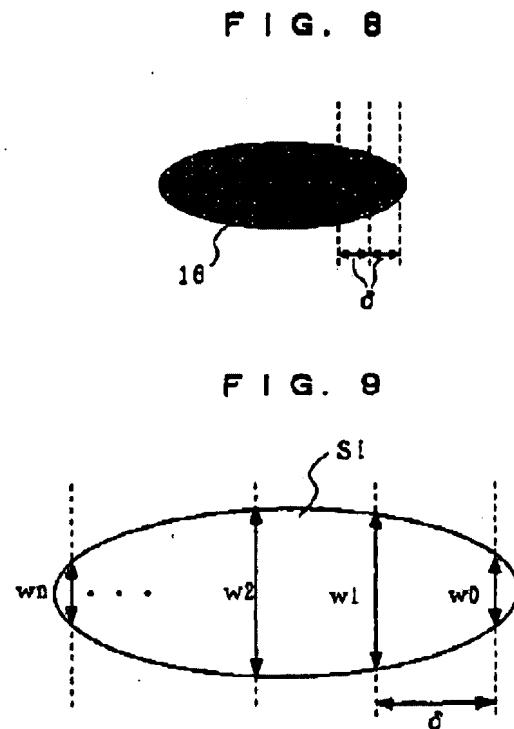
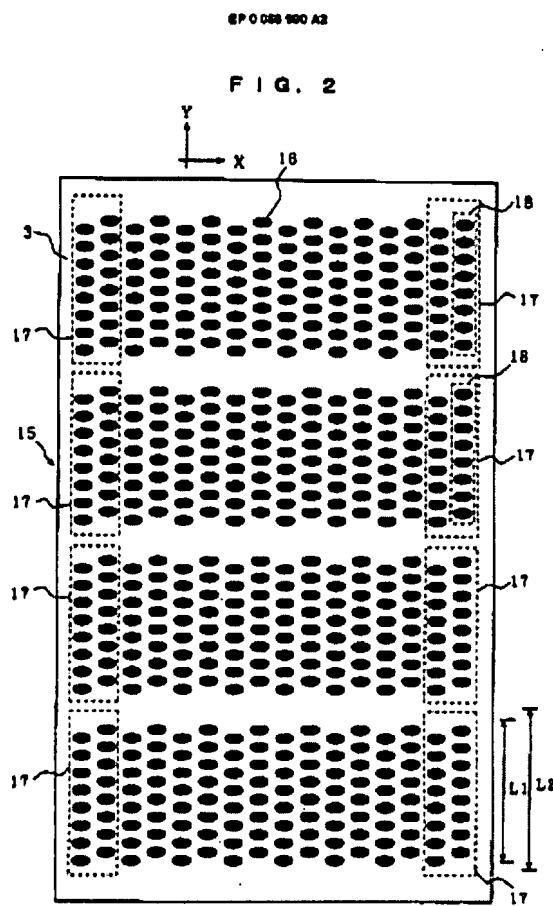


FIG. 6 (b)



b. As related to further dependent claim 27, the previous combination of Komiya et al., Shimada et al., and Taka et al. teach the limitations of claim 26, for the reasons above. Additionally, Shimada et al. teach a number of recording marks of size 80 to 100um, arranged in groups taking up an area that is readable by the set precision of the device being analyzed (Shimada et al. – Paragraph 49, Lines 1-5 and Figures 2, 8 & 9, shown below).



c. As related to further dependent **claim 28**, the previous combination of Komiya et al., Shimada et al., and Taka et al. teach the limitations of **claim 26**, for the reasons above. Additionally, Komiya et al. teach the correction chart being designed based on the properties, which are to be analyzed (Komiya et al. – Figure 8B and Figure 15, both shown below).

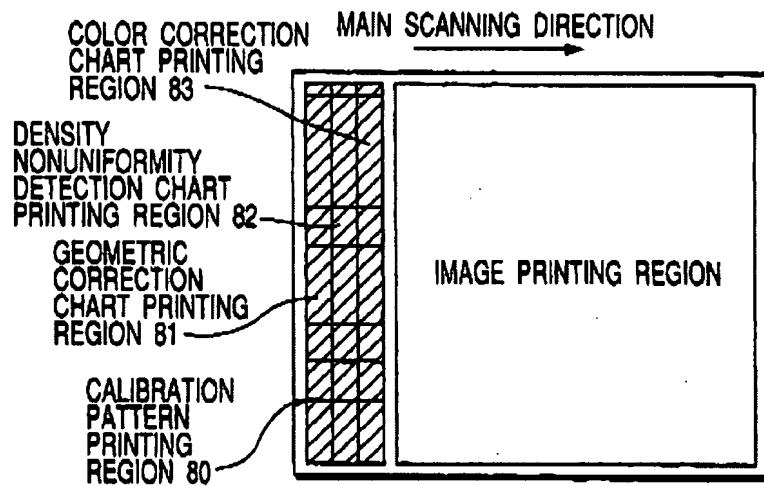


FIG. 8B

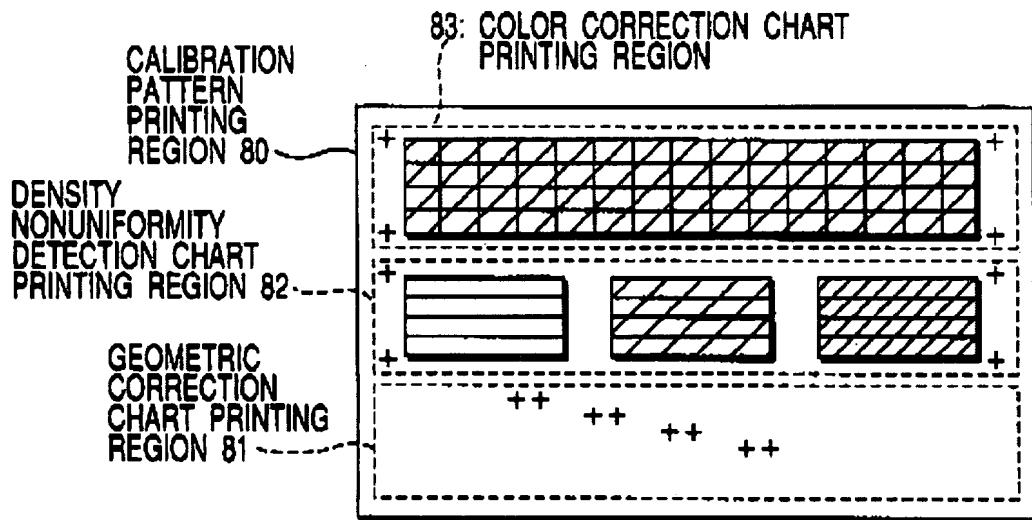
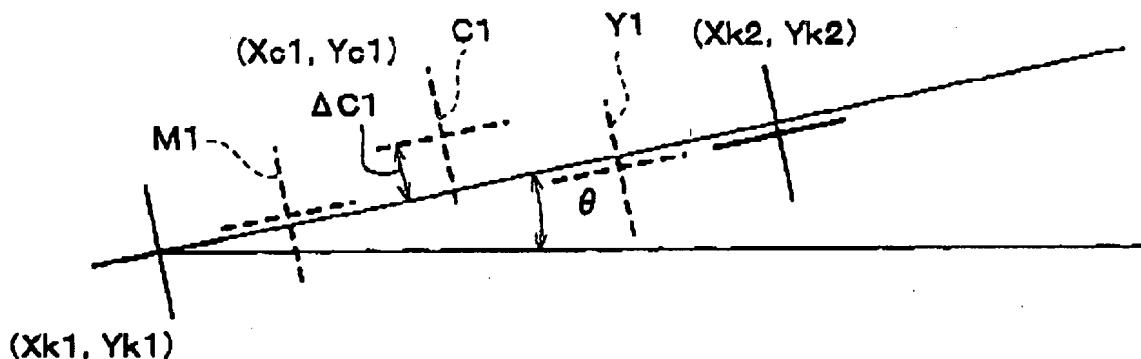


FIG. 15

- d. As related to dependent claim 31, the previous combination of Komiya et al. and Shimada et al. remains as applied above, but *does not* specifically teach using a plurality of image forming means and dividing the marks into chart components and determining

at least one reference mark and vector. *However*, Taka et al. teach using a plurality of image forming means and dividing the marks into chart components corresponding to the recording means as well as determining at least one reference mark and vector for each component (Taka et al. – Summary, Column 2, Lines 48-49, Figure 5, shown below and Figures 6(a) & 6(b), shown previously).

F I G. 5



e. As related to dependent **claim 50**, the previous combination of Komiya et al. and Shimada et al. remains as applied above, but *does not* specifically teach the analyzing step of dividing the test chart into a plurality of chart components. *However*, Taka et al. teach the step of dividing the test chart into a plurality of chart components to perform a relative comparison between the properties of them (Taka et al. – Description, Column 12, Line 12, Figures 6(a) & 6(b) shown previously).

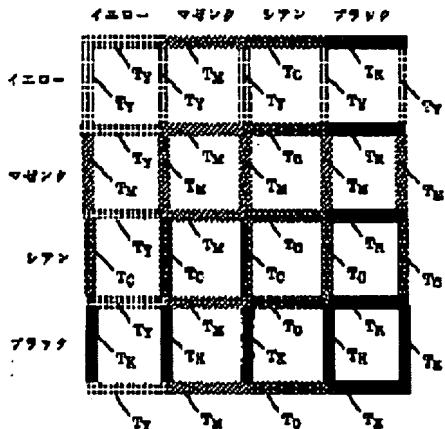
f. Given the same field of endeavor, specifically an image forming apparatus with a defect detection system and correction means, it is apparent that one of ordinary skill in

the art at the time the invention was made would have been motivated to combine the test chart and analyzing system including the specific units and the use of a specific number of marks as well as the method of use as taught by Komiya et al. and Shimada et al. with the analyzing system that calculates and uses the center position of the plurality of marks as well as dividing the test chart as taught by Taka et al. in an effort to minimize the differences and displacements and better perform analysis (Taka et al. – Abstract and Description, Column 11, Lines 18 & 22-24).

20. **Claim 32** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Komiya et al.**, (US 6,287,027 B1) **Shimada et al.**, (EP 0 988 990 A2) and **Taka et al.**, (US 7,106,942 B2) as applied to **claim 31** above, and further in view of **Sasahara et al.**, (JP 06-261156 A2).

The previous combination of Komiya et al., Shimada et al., and Taka et al. remains as applied above, but *does not* specifically teach the marks recorded in a different form corresponding to the chart component. *However*, Sasahara et al. teach groups of marks corresponding to chart components recorded in different form (Sasahara et al. – Drawing 6, shown below).

Drawing 6 【図6】



Given the same field of endeavor, specifically an image forming apparatus with an defect detection system and correction means, it is apparent that one of ordinary skill in the art at the time the invention was made would have been motivated to combine the precision requirements and the test chart requirements as taught by the combination of Komiya et al., Shimada et al. and Taka et al., with the test chart requirements consisting of groups of marks corresponding to chart components recorded in different form as taught by Sasahara et al., in an effort to properly evaluate the specific device being analyzed by providing the proper correction coefficient (Komiya et al. – Abstract, Lines 10-12).

21. **Claims 35 & 53** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Komiya et al.**, (US 6,287,027 B1) and **Shimada et al.**, (EP 0 988 990 A2) as applied to **claim 34 & 52** above, and further in view of **Hayashi et al.**, (EP 0 982 146 A2).

a. As related to dependent **claim 35**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 35**, for the reasons above. Additionally,

Komiya et al. teach correction adjustments in the specific order of geometric, density, and color (Komiya et al. – Description, Column 8, Lines 44 – 49 and Figure 7, shown below).

Komiya et al. *do not* specifically teach adjustments made ending in timing adjustment.

However, Hayashi et al. teach a timing correction section (Hayashi et al. – Abstract), as a part of a test chart analyzing system for making adjustments (Hayashi et al. – Figure 1, shown below), showing correction of timing to be the final step in the adjustment routine (Hayashi et al. – Figure 18, shown below).

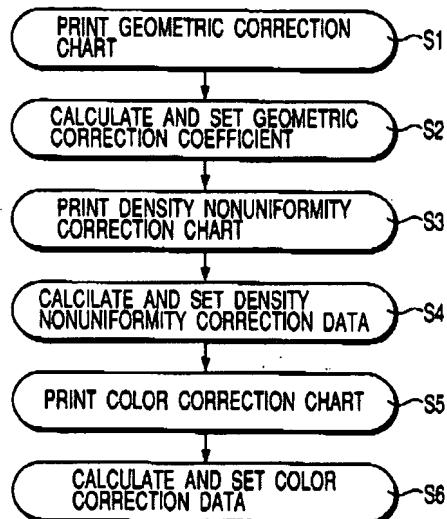


FIG. 7

FIG. 1

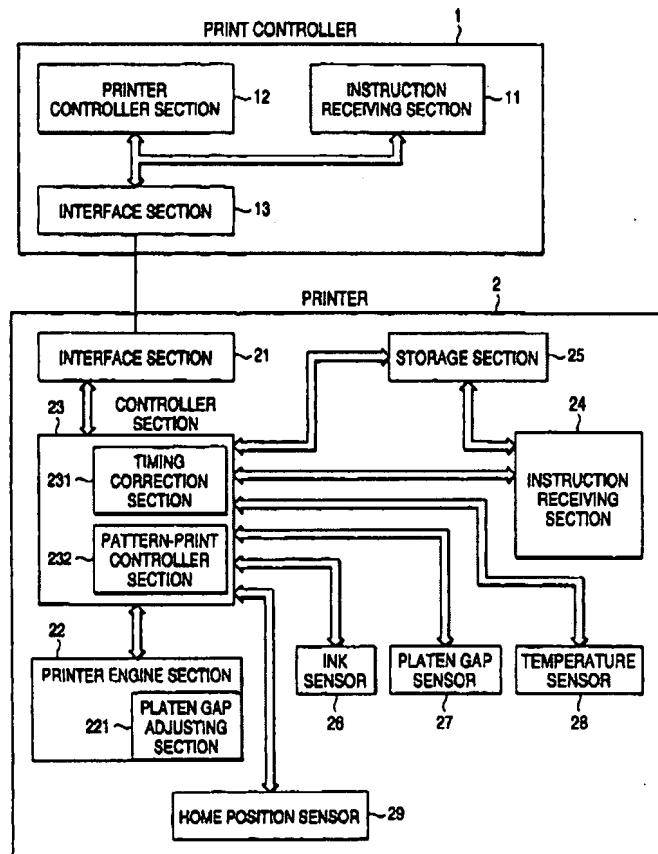
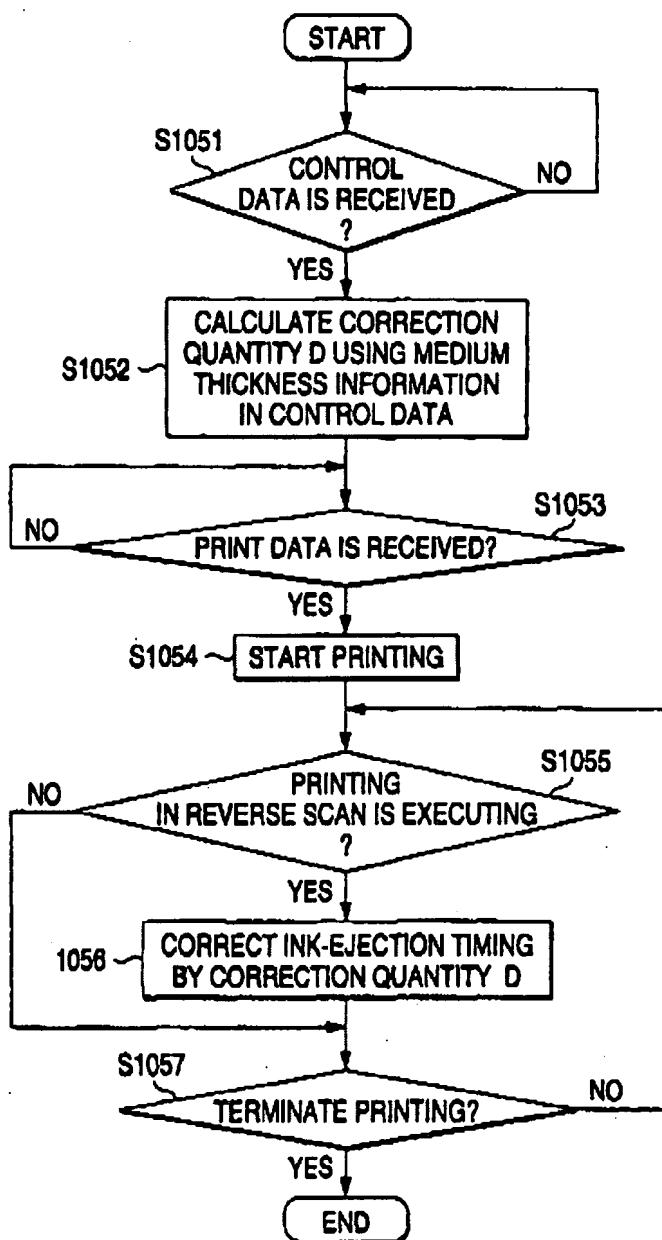


FIG. 18



b. As related to dependent **claim 53**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 52**, for the reasons above. Additionally, Komiya et al. teach correction adjustments in the specific order of geometric, density, and color (Komiya et al. – Description, Column 8, Lines 44 – 49 and Figure 7, shown above).

Komiya et al. *do not* specifically teach adjustments made ending in timing adjustment.

However, Hayashi et al. teach a timing correction section (Hayashi et al. – Abstract), as a part of a test chart analyzing system for making adjustments (Hayashi et al. – Figure 1, shown above), showing correction of timing to be the final step in the adjustment routine (Hayashi et al. – Figure 18, shown above).

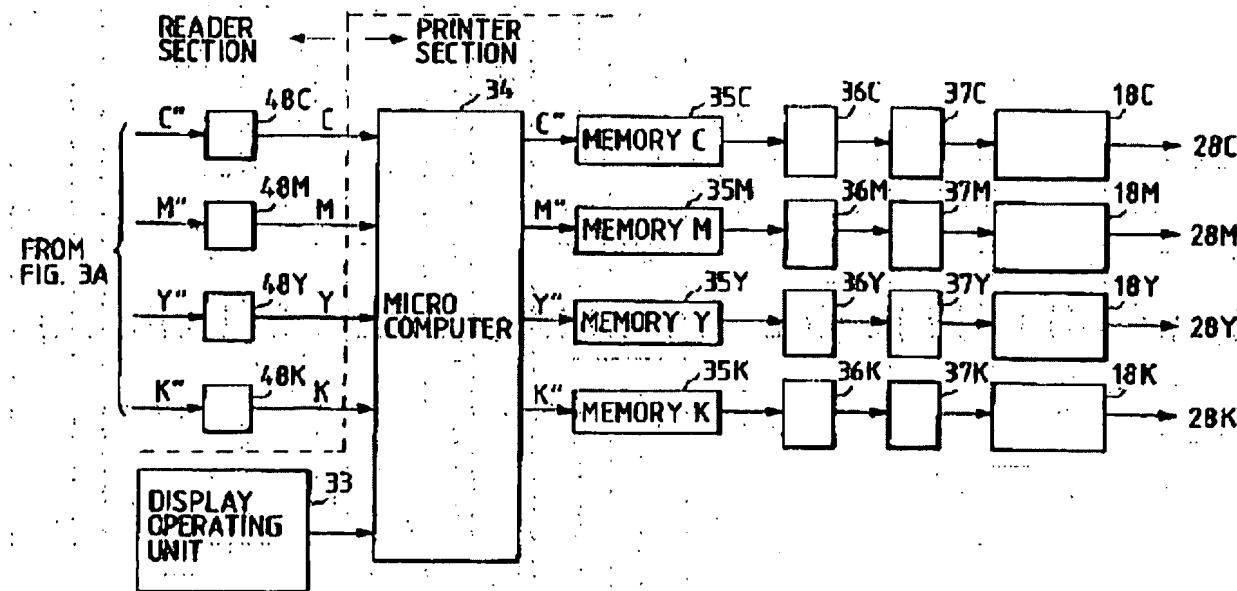
c. Given the same field of endeavor, specifically an image forming apparatus with an defect detection system and correction means, it is apparent that one of ordinary skill in the art at the time the invention was made would have been motivated to combine the test chart requirements and the steps of the analyzing system and the use of a specific number of marks as taught by Komiya et al. and Shimada et al. with the test chart requirements and steps of analyzing system consisting of a timing correction adjustment made as the final step of the routine as taught by Hayashi et al., in an effort to obviate printing-position offset (Hayashi et al. – Summary, Paragraph 11, Line 15).

22. **Claims 40, 41, 43 & 44** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Komiya et al.**, (US 6,287,027 B1) and **Shimada et al.**, (EP 0 988 990 A2) as applied to **claims 24 & 30** above, and further in view of **Takeuchi et al.**, (US 5,715,498 A).

g. As related to dependent **claim 40**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 30**, for the reasons above, but *does not* specifically teach the format storage means integrally held by the recording means.

However, Takeuchi et al. teach storing means for storing image data (Takeuchi et al. – Abstract), and having that memory integrally a part of the recording means (Takeuchi et al. – Figure 3B shown below).

FIG. 3B



h. As related to dependent **claim 41**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 24**, for the reasons above, but *do not* teach a transporting belt being used as another recording means for the test chart. **However**, Takeuchi et al. teach forming a plurality of registration marks to depict a test chart on the transfer belt in predetermined positions (Takeuchi et al. – Description, Column 11, Lines 27 & 38-39).

i. As related to dependent **claim 43**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 24**, for the reasons above, but *do not* specifically teach the geometric property format designed giving consideration to the image size handled by the system. **However**, Takeuchi et al. teach geometric property formats that are designed with specifics based on size of the image, the precision of the

devices, and the resolving power of the systems (Takeuchi et al. – Description, Column 9, Lines 14-16, 19-21, and Column 11, Lines 8-12, 21-23).

j. As related to dependent **claim 44**, the previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 24**, for the reasons above, but *do not* specifically teach the recording the plurality of marks with higher recording precision than the required analysis precision. **However**, Takeuchi et al. teach the required analysis precision to be 400-600 dots/inch (Takeuchi et al. – Description, Column 9, Line 16) and the recording precision to be 600 dots/inch (Takeuchi et al. – Description, Column 11, Lines 60-61).

k. Given the same field of endeavor, specifically an image forming apparatus with an image correction system, it is apparent that one of ordinary skill in the art at the time the invention was made would have been motivated to combine the test chart and analyzing system including the storage unit for storing parameters and the plurality of marks and the design as taught by as taught by Komiya et al. and Shimada et al. with the use of a storage integrally a part of the recording means, the use of the transporting belt as a recording medium for the test chart, and the format design as taught by Takeuchi et al., in an effort to reduce the amount of external devices needed while storing the image data required (Takeuchi et al. – Description, Column 2, Lines 53-54) and reduce the amount of materials needed by allowing reuse of the transfer belt by the registration marking means (Takeuchi et al. – Description, Column 10, Lines 62-63 and Column 11, Line 4) as well as produce the proper image size and precision relative to the analyzing

system's capabilities (Takeuchi et al. – Description, Column 9, Lines 14-16, 19-21, and Column 11, Lines 8-12).

23. **Claim 42** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Komiya et al.**, (US 6,287,027 B1) **Shimada et al.**, (EP 0 988 990 A2) and **Takeuchi et al.**, (US 5,715,498 A) as applied to **claim 41** above, and further in view of **Johnson**, (US 6,982,812 B2).

The previous combination of Komiya et al., Shimada et al., and Takeuchi et al. remains as applied above, but **does not** specifically teach a suctioning means used to fix recording medium on to the belt face by air suctioning through a plurality of openings, and further **does not** teach a plurality of openings formed on the belt face serving as the plurality of marks. **However**, given what is commonly known in the art of printing apparatuses, that being the use of vacuum suction to fix printing media to a transport belt, it would have been obvious to one of ordinary skill in the art at the time the invention was made to realize that the common method of affixing printing media to a transport belt via suction, would be a viable and probable method used by Komiya et al. without departing from the spirit or scope of the general inventive concept as defined (Komiya et al. - Description, Column 12, Lines 5-8). Additionally, Johnson **does** teach an analyzing system that incorporates off-media calibration performed to obtain off-media measured values without placing colorant on print media (Johnson – Abstract), and further mentions various methods of off-media calibration including those that have no impact on the customer (Johnson – Summary, Column 2, Lines 19-20, 25-27, and 46-48). Given the same field of endeavor, specifically an image forming apparatus with an image correction system, it is apparent that one of ordinary skill in the art at the time the invention was

made would have been motivated to combine the use of a transport belt as the recording surface as taught by the combination above along with the traditional use of vacuum suction to affix printing media to a transport belt with the use of the openings formed for suction to provide an optional off-media test chart for use in off-media calibration as taught by Johnson, in an effort to reduce the amount of materials needed to none (Johnson – Summary, Column 2, Line 48), by allowing reuse of the transfer belt by the registration marking means (Takeuchi et al. – Description, Column 10, Lines 62-63 and Column 11, Line 4).

24. **Claim 45** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Komiya et al.**, (US 6,287,027 B1) **Shimada et al.**, (EP 0 988 990 A2) and **Takeuchi et al.**, (US 5,715,498 A) as applied to **claim 44** above, and further in view of **Taka et al.**, (US 7,106,942 B2).

The previous combination of Komiya et al., Shimada et al., and Takeuchi et al. remains as applied above, but *does not* specifically teach a the image pickup means being analyzed before the properties of the recording means. *However*, Taka et al. teach the image pickup means as the initial step of the analyzing system and the recording means as a later step of the analyzing system (Taka et al. – Figures 2 & 3, shown below).

FIG. 2

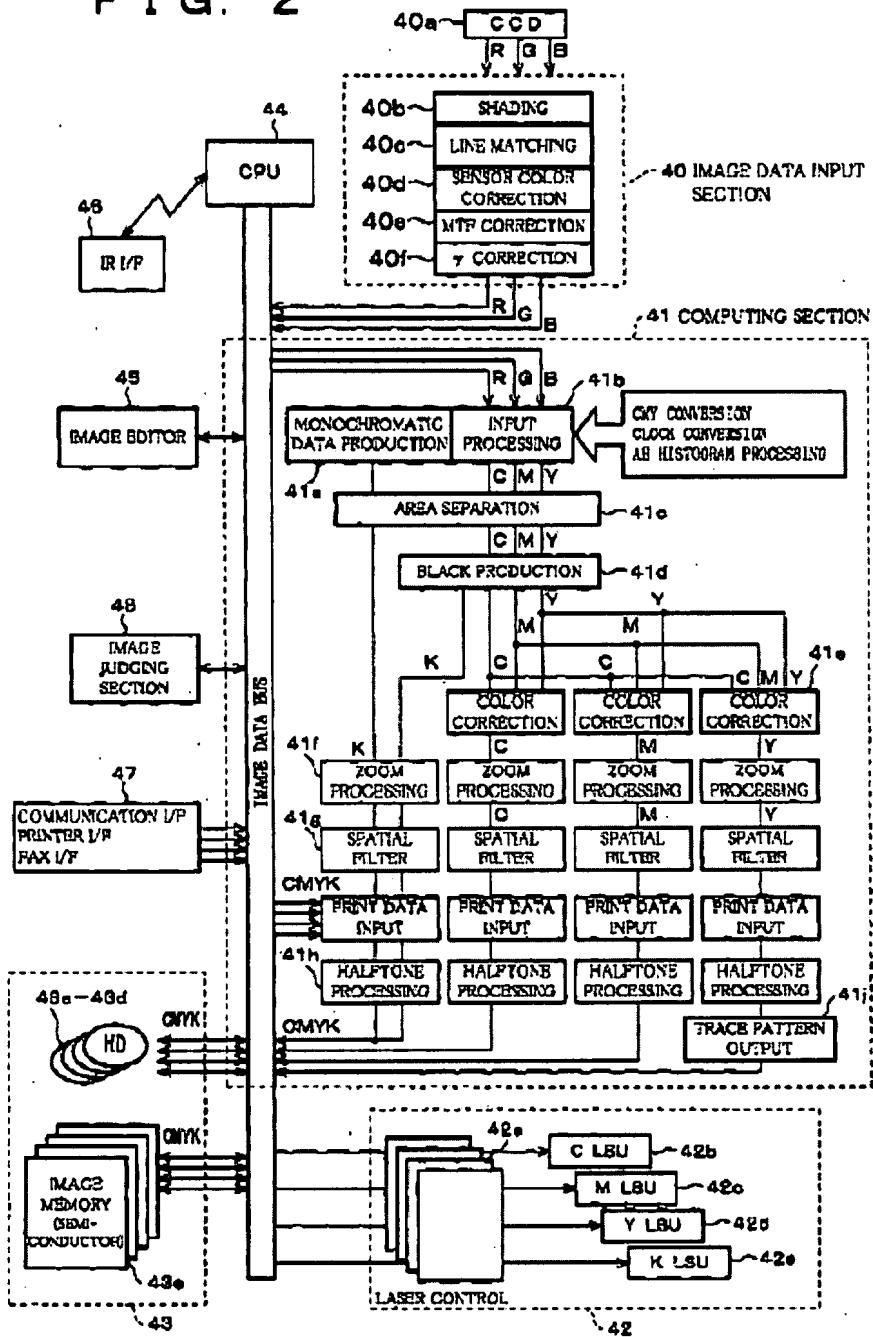
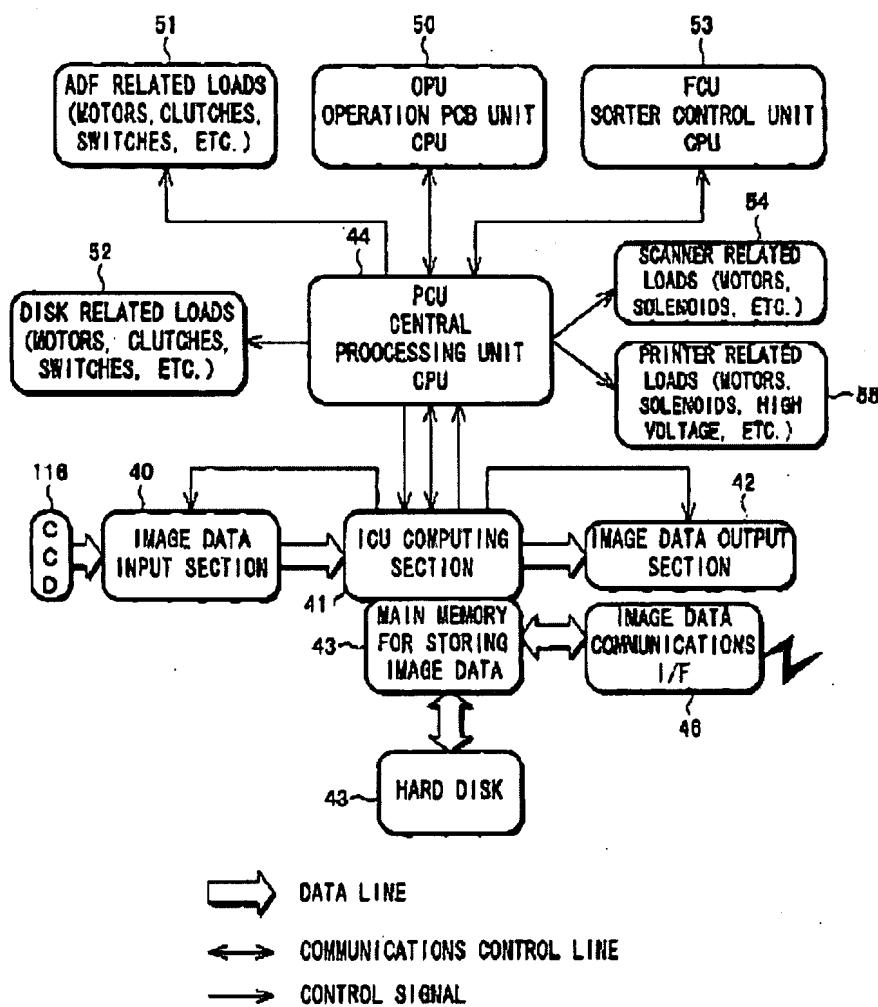


FIG. 3



Additionally, Takeuchi et al. teach using three registration marks in creation of the reference chart to enable more detailed correction of image distortion thereby providing more recording precision than the recording precision of the recording means (Takeuchi et al. – Description, Column 20, Lines 26-28, Lines 49-50). Given the same field of endeavor, specifically an image forming apparatus with an image correction system, it is apparent that one of ordinary skill in the art at the time the invention was made would

have been motivated to combine the analyzing system as taught by the combination above, with the analyzing system detailed steps as taught by Taka et al. in an effort to utilize the information gleaned from the measurements and analysis to correct the displacements accordingly (Taka et al. – Abstract).

25. **Claim 49** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Komiya et al.**, (US 6,287,027 B1) and **Shimada et al.**, (EP 0 988 990 A2) as applied to **claim 48** above, and further in view of **Sasahara et al.**, (JP 06-261156).

The previous combination of Komiya et al. and Shimada et al. teach the limitations of **claim 48**, for the reasons above. Additionally Komiya et al. teach calculating and setting various correction data for the printer in advance based on multiple inputs (Komiya et al. – Figures 4A & 7, shown below), and avoiding interference by printing various regions based on which property is to be analyzed (Komiya et al. – Figure 15, shown below).

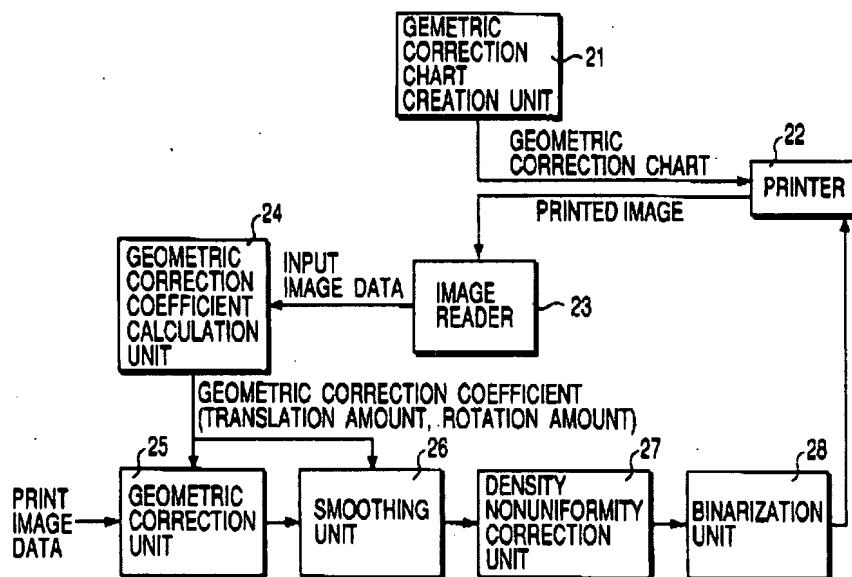


FIG. 4A

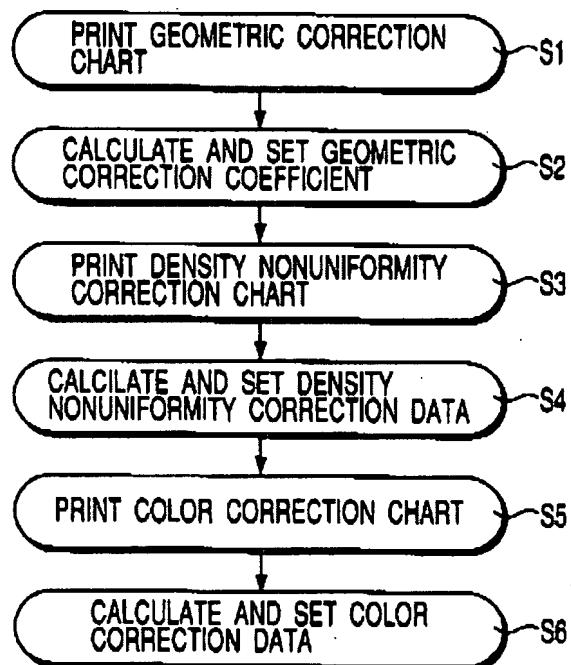


FIG. 7

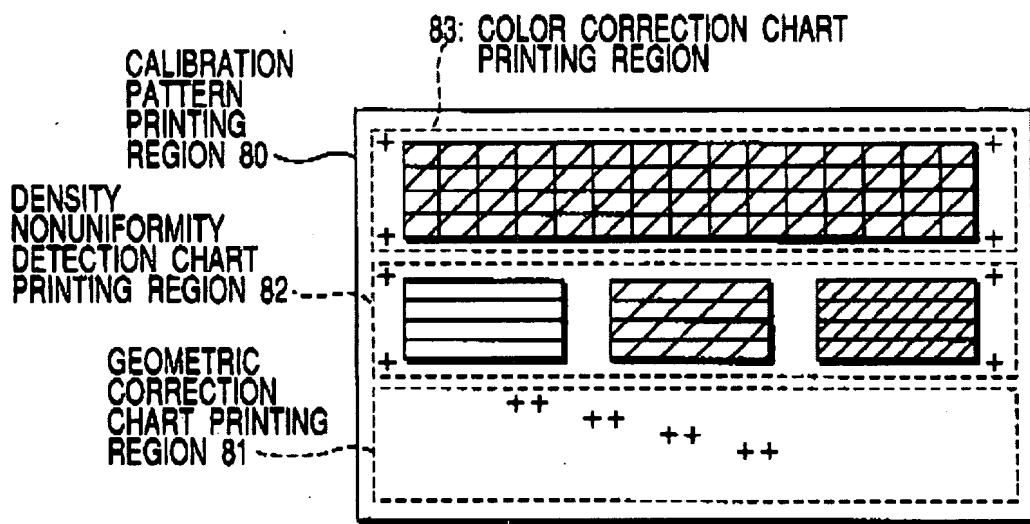


FIG. 15

The combination **does not** specifically teach the plurality of marks recorded based upon at least two kinds of the geometric property formats in advance. **However**, Sasahara et al. teach a method wherein a plurality of marks are recorded and the measurement and analysis is performed beforehand (Sasahara et al. – Description, Paragraph 47, and Drawing 6 shown previously). Given the same field of endeavor, specifically an image forming apparatus with an defect detection system and correction means, it is apparent that one of ordinary skill in the art at the time the invention was made would have been motivated to combine the calculating and setting of various correction data as taught by Komiya et al. and Shimada et al., with the measurement and analysis performed in advance as taught by Sasahara et al. in an effort to properly evaluate the specific device being analyzed by providing the proper corrections at the appropriate time (Komiya et al. – Abstract, Lines 10-12).

26. **Claim 56** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Komiya et al.**, (US 6,287,027 B1) in view of **Shimada et al.**, (EP 0 988 990 A2) **Takeuchi et al.**, (US 5,715,498 A) and **Miyake et al.**, (EP 0 918 432 A2).

Komiya et al. teach a geometric property analyzing system for analyzing geometric properties regarding at least one of a recording device, a recording medium, and an image pickup apparatus (Komiya et al. – Abstract and Figure 6 shown below).

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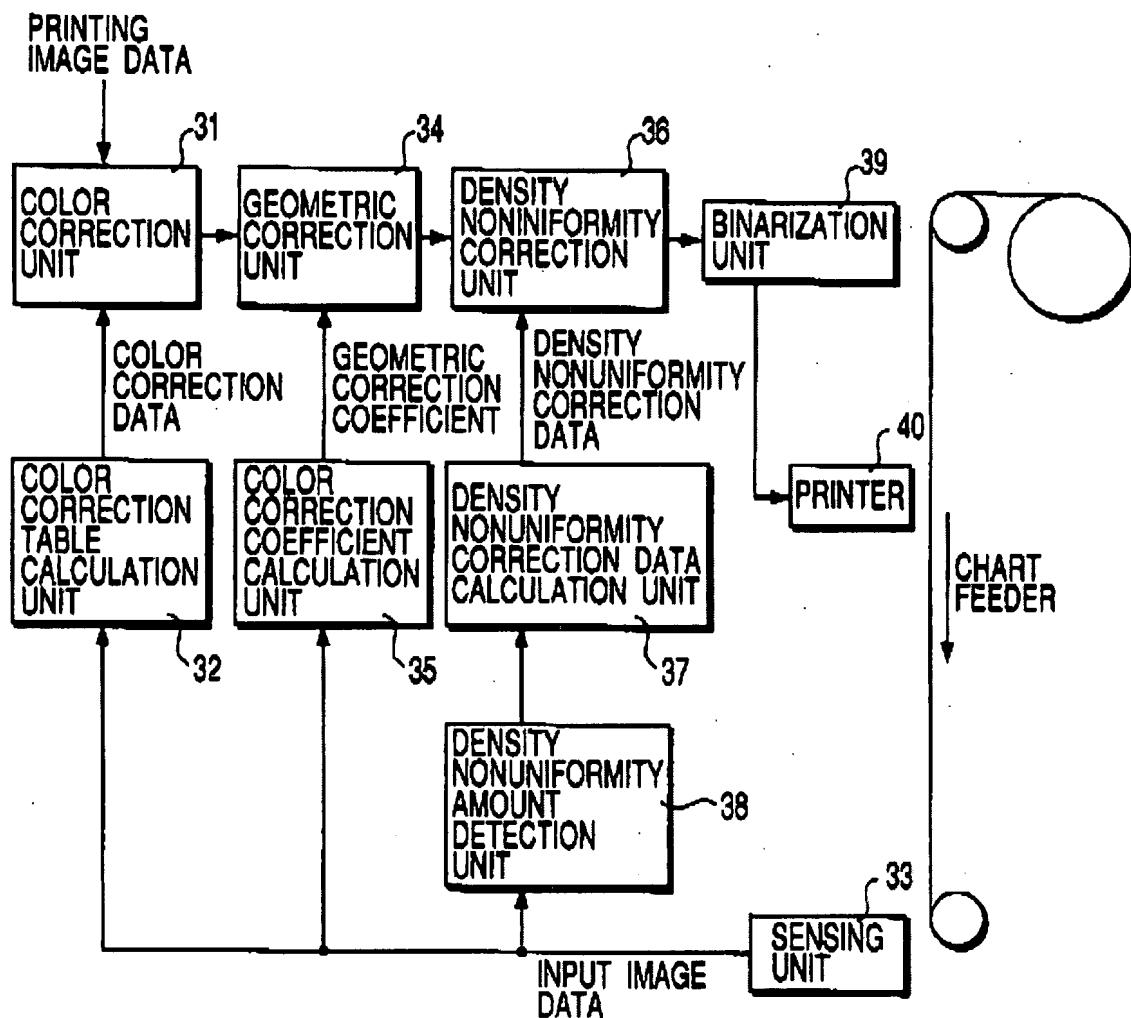


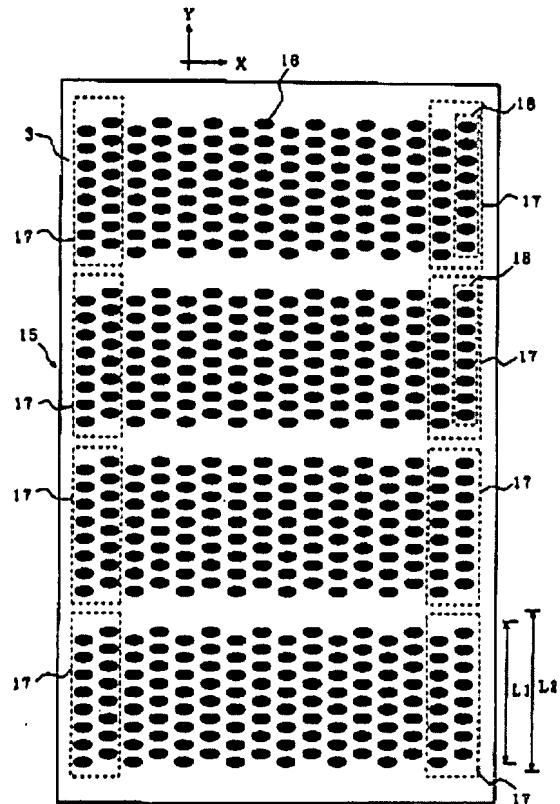
FIG. 6

Continuing, Komiya et al. teach a format storing unit [i.e. a test image storage unit] for storing the geometric property format, included in the system, and a storage unit for storing the calculated parameters (Komiya et al. Summary, Column 2, Lines 48-58), as well as a printing unit for printing a test chart on a recording face of the recording medium (Komiya et al. – Figure 6, Reference #40, shown above), an image picking-up unit [i.e. sensing unit] for optically reading out the test chart and creating a chart image

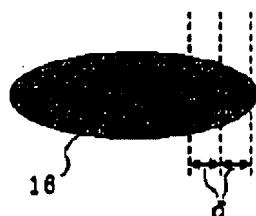
(Komiya et al. – Figure 6, Reference #33, shown above), and an analyzing unit [i.e. correction unit] for determining at least one of a reference point and a reference vector for determining the predetermined positions of the plurality of marks in the chart image such that the sum of squares of the difference becomes minimum between the predetermined positions of the plurality of marks in the chart image formed in the image picking-up unit and the predetermined positions of the plurality of marks based on the geometric format stored in the format storing unit (Komiya et al. – Figure 6, Reference #31, #34, & #36 and Figure 4A, Reference #25, both shown above). Komiya et al. **do not** teach the number of recording marks based on the predetermined geometric property format. **However**, Shimada et al. teach a number of recording marks of size 80 to 100um, arranged in groups taking up an area that is based on the predetermined geometric property format [i.e. readable by the set precision of the device being analyzed] (Shimada et al. – Paragraph 49, Lines 1-5 and Figures 2, 8 & 9, shown below).

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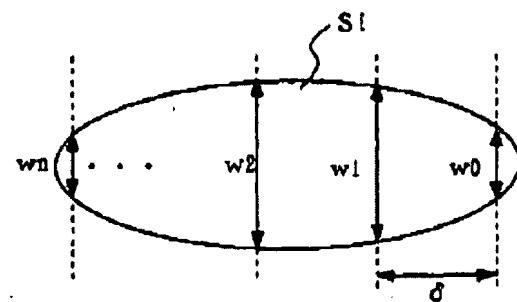
F I G. 2



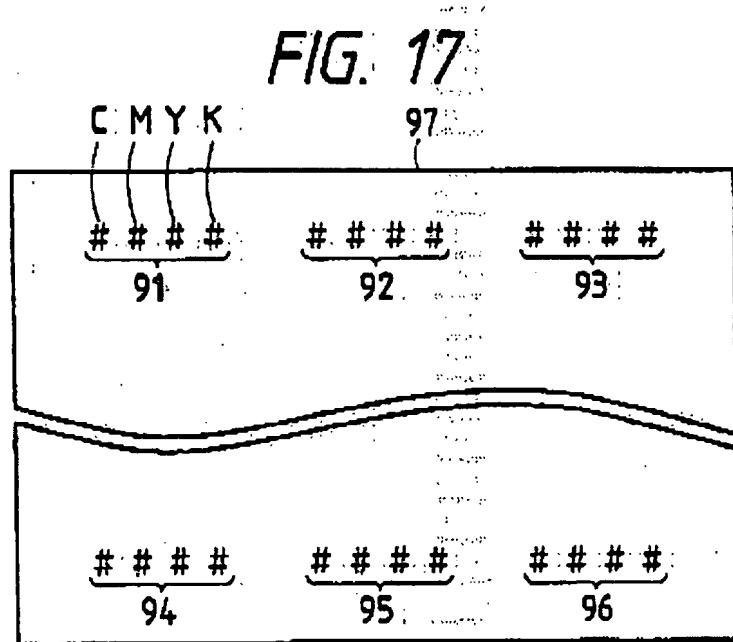
F I G. 8



F I G. 9



Continuing, Komiya et al. *do not* specifically teach the plurality of marks arrayed at the same intervals along at least one direction. **However**, Takeuchi et al. teach a plurality of marks arrayed at the same intervals along one direction (Takeuchi et al. – Figure 17 shown below).



Continuing, Komiya et al. *do not* specifically teach the same number of marks between chart components, recorded along a predetermined direction such that unintended deviation can cancel each other out. *However*, Miyake et al. teach the plurality of marks arranged in a predetermined pattern with uniformity along the direction orthogonal to a predetermined direction thereby canceling out any unintended deviations (Miyake et al. – Abstract, Line 1 and Figures 5 & 8, shown below).

FIG. 5

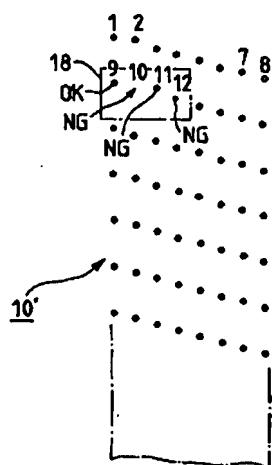
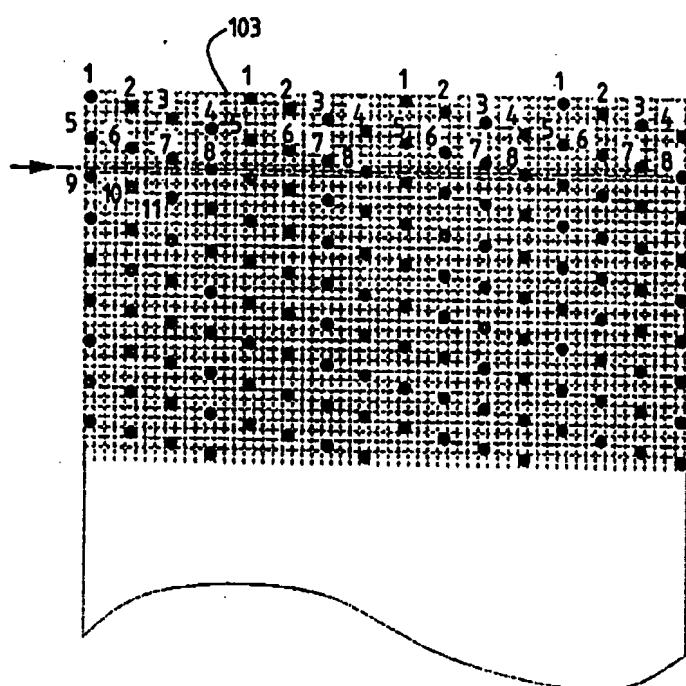


FIG. 8



Given the same field of endeavor, specifically an image forming apparatus with a defect detection system and image correction means, it is apparent that one of ordinary skill in the art at the time the invention was made would have been motivated to use whatever mathematical equation was required to produce the most accurate results and minimize errors to include the well known sum of squares while combining the precision requirements and the test chart requirements as taught by Komiya et al. with the use of a specific ink-jet head and the use of a specific number of marks, specifically located as required for proper precision and the test chart comprising multiple groups as taught by Shimada et al., the test chart requirements and design including the plurality of marks or the same number of marks arranged in at least one direction and more arranged in one direction than the other as taught by Takeuchi et al. and the test chart requirements consisting of the plurality of marks arranged in a predetermined pattern to allow the canceling out of any unintended deviations as taught by Miyake et al., in an effort to obtain a non-defective image from the image forming apparatus (Miyake et al. – Abstract, Lines 4-5), while enabling more detailed correction of image distortion and providing an image with all aberrations corrected for (Takeuchi et al. – Description, Column 20, Lines 27-28 and Summary, Column 2, Lines 1-3) and finally to judge any failure or aberration on a group or component basis (Shimada et al. – Abstract, Lines 11-12), as well as to do so with publicly known devices so as to avoid the need of illustrative description (Shimada et al. – Description, Paragraph 46, Lines 14-17).

Response to Arguments

27. Applicant's arguments with respect to **claims 24 & 26-55** have been considered but are moot in view of the new ground(s) of rejection.

28. With respect to **claim 24**, and therefore **claims 26-47**, which inherently contain all of the limitations of independent **claim 24**, applicant amended the independent claim to further specify the image pickup means for optically reading a specialized test chart and the use of an analyzing means with the specific use of a sum of squares equation. Due to these amendments, a further search was necessitated thereby producing additional prior art and more specific notation of existing prior art of record. Applicant argues that the specific use of a sum of squares equation provides a means to "more accurately analyze geometrical characteristics" and that "Komiya et al. is incapable of sufficiently performing geometric correction." In response to applicant's argument that determining that "the sum of squares of the difference becomes minimum" and "Komiya et al. is incapable of sufficiently performing geometric correction" is merely a use of a specific mathematical equation to provide a measured minimum. While the applicant has suggested in the argument that his or her use of the sum of squares is more accurate than another mathematical equation used to provide a measured minimum, given the fact that applicant has chosen to use a well-known method [i.e. sum of squares] for determining the amount of positional shift or difference, particularly in image processing, merely serves to emphasize the non-patentability over the existing prior art. As no further arguments were made, all dependent claims have been rejected accordingly.

29. With respect to **claim 48**, and therefore **claims 49-55**, which inherently contain all of the limitations of independent **claim 48**, applicant amended the independent claim to further specify the image pickup means for optically reading a specialized test chart and the use of an analyzing

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means with the specific use of a sum of squares equation. Due to these amendments, a further search was necessitated thereby producing additional prior art and more specific notation of existing prior art of record. Applicant argues that the specific use of a sum of squares equation provides a means to “more accurately analyze geometrical characteristics” and that “Komiya et al. is incapable of sufficiently performing geometric correction.” In response to applicant’s argument that determining that “the sum of squares of the difference becomes minimum” and “Komiya et al. is incapable of sufficiently performing geometric correction” is merely a use of a specific mathematical equation to provide a measured minimum. While the applicant has suggested in the argument that his or her use of the sum of squares is more accurate than another mathematical equation used to provide a measured minimum, given the fact that applicant has chosen to use a well-known method [i.e. sum of squares] for determining the amount of positional shift or difference, particularly in image processing, merely serves to emphasize the non-patentability over the existing prior art. As no further arguments were made, all dependent claims have been rejected accordingly.

30. With respect to **claim 56**, applicant added the claim “based on the subject matter of (now canceled) claim 14 rewritten in independent form as a ‘system’ claim” further specifying the image pickup means for optically reading a specialized test chart and the use of an analyzing means with the specific use of a sum of squares equation. Due to the new independent claim, a further search was necessitated thereby producing additional prior art and more specific notation of existing prior art of record. See rejection detailed above as well as response to arguments concerning **claims 24 & 48** for response to applicant’s argument of patentability.

Conclusion

31. Additional prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sekizawa et al. (US 4,745,467 A) teach an image processing apparatus with conversion and correction based on minimum sum of square error method. Specht et al. (US 4,805,123 A) teach an inspection method and apparatus including improved defect detector and alignment for correcting the detected misalignment, using a sum of squares equation.
32. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John P. Zimmermann whose telephone number is 571-270-3049. The examiner can normally be reached on Monday - Thursday, 7:00am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on 571-272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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JPZ

Matthew Luu

**MATTHEW LUU
SUPERVISORY PATENT EXAMINER**